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EXAMINER
MILLER, RYAN J

ART UNIT	PAPER NUMBER
2621	

DATE MAILED: 05/16/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/504,022	SZELISKI ET AL.	
	Examiner	Art Unit	
	Ryan J. Miller	2621	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 March 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 February 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Response to Amendment

1. The amendment received on March 5, 2003 has been entered. Claims 1-20 remain pending. An action on the merits shall follow.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 6-20 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Claims 6 and 9 have been amended to include the limitations "using a 3D graphics rendering device" and "a 3D graphics rendering processor", respectively. However, nowhere in the specification is a 3D graphics rendering device or processor disclosed. On page 3, lines 18-27 of the specification, a 3D graphics rasterizer is described. Is this device equivalent to a "3D graphics rendering device"? Or are the two devices fundamentally different? Clarification of this issue is required. Amended claim 9, further describes a system that includes a raster processor and a 3D graphics rendering processor. As can be seen from Fig. 5 of the applicant's disclosure the system has only one graphics processor. Nowhere in the specification or in the figures are two graphics processors described in the same system.

Claims 7-8 and 10-20 are rejected as being dependent upon rejected claims.

4. Claims 6-20 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. The arguments from the previous action as well as new issues will be addressed below.

In order to clarify the basis of this rejection, the examiner will begin with a brief summary of the specification. The specification seems to be drawn (in part) to a system for comparing an image and a template to determine "a match or non-match between the template and the image" (specification page 8, line 19). During the comparison, the template and image may be geometrically transformed (i.e., claimed as "raster transformed") such as "incrementally rotated or skewed" (specification page 8, line 10). This aspect of the disclosed invention is described generally at section II, General Overview, and is depicted in Fig. 2.

However, the specification describes certain (presumed) implementations of this comparison process that are not well understood as disclosed. For example, Section III, Details of Components and Operation, presumably describes an implementation of the image comparison in a "rendering" embodiment. For example, this is described at specification page 10, lines 5-19 and as depicted in Fig. 3. While this implementation seems to discuss the model generation, the interpolation of texture, and the computing of statistics between color values, there is no discussion of image comparison, and no apparent link to the image comparison disclosure of section II, General Overview. In fact, it is not clear from the specification what section III is disclosing at all. What process is being performed by section III? There is a fundamental disconnect between sections II and III in that it is not described how the image

comparison of section II, and as depicted in Fig. 2, is utilized in the model generation, texture interpolation and statistics computation of section III.

Specification page 11, beginning at line 12, seems to return to the image comparison embodiment where at page 12, a metric of comparison is disclosed. Pages 13 and 14 then seem to discuss alternate methods of comparing two images.

Section V, Working Example, then seems to return to the model generation discussed at section III. Again, it is not clear from the description of the working example how, if at all, two images are being compared commensurate with the general overview of section II.

In summary, there seem to be two distinct disclosures in the specification that are not related, or reliant upon one another. While the examiner understands those portions of the specification relating to the comparison of two images (e.g., Fig. 2), the examiner does not understand how the image comparison is related to the model generation as depicted in Figs. 3-5.

Furthermore, the specification is replete with the terms "can be". The system described by the specification is a computer-based system and, therefore, it "can" perform many different functions depending on how it is programmed. Therefore, the specification must positively recite the functions of the system, and not just describe the functions that the system can or cannot perform.

The claims directed to these portions of the specification appear to be claims 6-20. Amended claim 9 will be used to exemplify the 112, first paragraph rejection; but all of the above mentioned claims are rejected on the same grounds, for the same reasons. Claim 9 requires a processor that transforms templates and a processor that compares image associated with the templates. This seems to be supported by the specification in relation to figure 2, and

section II. However, the newly amended claim includes a third processor, a 3D graphics rendering processor. First of all, nowhere in the specification is a "3D graphics rendering processor" mentioned. What is a "3D graphics rendering processor"? On page 3, lines 18-27 of the specification, a 3D graphics rasterizer is described. Is this device equivalent to a "3D graphics rendering device"? Furthermore, every embodiment of the system described in the specification has two processors, a host processor and a graphics processor. There is no teaching or suggestion in the specification for the use of multiple graphics processors as described in claim 9. The remaining aforementioned claims are rejected on the same grounds. Clarification is required.

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 6-20 rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claims 6-20 are drawn to an invention that lacks enablement, and lacks clear and understandable support in the specification as described above. In summary, the examiner is uncertain how the disclosed image comparison is related to the disclosed model generation/texture interpolation embodiments as described above. Therefore, the metes and bounds of the claims that are apparently drawn to the model building embodiment and that include image comparison are completely unclear. That is, the claims cannot be understood in light of the disclosure. In addition, as it appears the claims define an invention that lacks support in the disclosure, the claim appear to be inconsistent with the specification and are rejected under 112 second paragraph on this basis. That is, if the claimed invention is inconsistent with the

disclosed invention, the metes and bounds of the claim are unclear for that reason alone (see MPEP 2173.03).

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-3, 9-17, 19, and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Neff et al. (U.S. Patent No. 5,809,171 A). These rejections advanced in the previous action are incorporated herein by reference; the details of which will not be repeated

9. Claims 1-8 are rejected under 35 U.S.C. 102(b) as being anticipated by Sacks et al. (U.S. Patent No. 4,736,437 A).

As applied to claim 1, Sacks et al. discloses a method for comparing and matching a first set of digital data to at least a second set of digital data, comprising: using a graphics rasterizer to raster transforming at least one of the first set of digital data and the second set of digital data (see Fig. 1, Fig. 3, and column 10, line 61 – column 11, line 13: The reference describes a video memory 20 (i.e. first set of digital data) and a reference memory 16 (i.e. second set of digital data). The second set of digital data is rotated and read out in a scanning line pattern (i.e. raster transformed) as can be seen in Fig. 3. The setup in Fig. 1 is equivalent to the setup in Fig. 4 of the applicant's specification. Therefore, this system is a graphics rasterizer.); and statistically comparing and matching the raster transformed sets of digital data to appropriately

corresponding portions of each other (see Fig. 1: The data is statistically compared and matched by the convolver 22.).

As applied to claim 2, Sacks et al. discloses analyzing the statistical comparisons and generating new transformations for matching the sets of data (see Fig. 1: The statistical comparisons are analyzed by the CPU 10 and then new transformations are generated by the rotator 18.).

As applied to claim 3, Sacks et al. discloses statistically comparing the raster transformed sets of digital data until a match or non-match between the first and second sets of data is achieved (see column 8, lines 23-29: The reference describes accumulating information (i.e. statistically comparing) until the CPU 10 determines a best match (i.e. until a match or non--match between the first and second sets of data is achieved).).

As applied to claim 4, Sacks et al. discloses raster transforming comprises raster transforming at least one of the first or the second set of digital data and computing statistics on the transformation (see Fig. 1: The raster transform in Sacks comprises rotating the reference image and then convolving it with the video image (i.e. computing statistics). This process is then repeated and the results of the convolution are accumulated by accumulator 24.).

As applied to claim 5, Sacks et al. discloses that statistically comparing and matching comprises analyzing the computed statistics of the transformation and calculating new and different transformations on the digital data (see Fig. 1: The results of the convolution (i.e. computed statistics) are accumulated by accumulator 24 and then sent to CPU 10 where the results are analyzed. The CPU then sends information to rotator 18 so that different transformations can be performed on the reference image.).

As applied to claim 6, Sacks et al. discloses a method for comparing and matching a first set of digital data to at least a second set of digital data, comprising: loading at least one of the first and second sets of digital data into a first memory device (see Fig. 1: Digital data is loaded into reference memory 16.); using a 3D rendering device for rendering model transformations and accumulating statistics of the loaded digital data (see Fig. 3 and column 10, line 61 – column 11, line 13: The reference describes that the angle rotator initially rotates the scanning line of the information stored in the reference memory 16 (i.e. rendering model transformations). This information is then covolved with the information in the video memory 20 and these values are accumulated by accumulator 24 (i.e. accumulating statistics). (Note: The specification does not describe a 3D rendering device. The examiner assumes that this device is equivalent to a graphics rasterizer. Therefore, this limitation is met by the reference as described in the rejection of claim 1.).); adjusting the model transformations based on the accumulated statistics (see Fig. 1: The accumulator 24, which accumulates the results from the convolver 22, sends information (i.e. accumulated statistics) to the CPU 10. The CPU 10 then uses this information to adjust the angle of rotation used by the rotator 18 to rotate the reference image (i.e. model transformation).); and statistically comparing and matching the model transformations of the loaded set of digital data to appropriately corresponding portions of the other set of digital data (see Fig. 1: The data is statistically compared and matched by the convolver 22).

As applied to claim 7, Sacks et al. discloses statistically comparing the sets of digital data until a match or non-match between the first and second sets of data is achieved (see column 8, lines 23-29: The reference describes accumulating information (i.e. statistically comparing) until

the CPU 10 determines a best match (i.e. until a match or non-match between the first and second sets of data is achieved).).

As applied to claim 8, Sacks et al. discloses adjusting the models comprises analyzing the statistical comparisons and generating new transformations for matching the sets of data (see Fig. 1: The results of the convolution (i.e. computed statistics) are accumulated by accumulator 24 and then sent to CPU 10 where the results are analyzed. The CPU then sends information to rotator 18 so that different transformations can be performed on the reference image.).

Response to Arguments

10. Applicant's arguments filed March 5, 2003 have been fully considered but they are not persuasive.

Drawing Objection

Summary of Argument: The drawing objection should be withdrawn in light of the amendment to the specification.

Examiner's Response: Examiner agrees. The objection has been withdrawn in light of the amendment to the specification.

Claim Objections

Summary of Argument: Claim 6 has been amended to replace the term "models" with the term "model transformations. This correction has also been made in claim 8. This amendment overcomes the objection to claim 6. With regard to claims 11 and 12, the objection has been

overcome due to the amendment of claims 11 and 12. Claims 11 and 12 now correctly depend from claim 10.

Examiner's Response: The examiner agrees. The claim objections have been withdrawn in light of the amendments to claims 6, 11, and 12.

35 U.S.C. 112, first paragraph rejections

Summary of Arguments: The applicant argues that the specification is clear on its face in view of the detailed description provided in the application. In particular, the applicant contends that a) the rendering environment described in Section III is most definitely linked to the image comparison sections of the disclosure. The applicant states that a point of novelty of the invention is the use of a conventional graphics rasterizer to compute statistics, which can then be compared as described on page 10, lines 4-19 of the specification. Next the applicant contends that b) a 3D graphics rasterizer can be used for processing templates and images so as to gather statistics for the statistical matching described in the specification. This is described on page 3, line 18 – page 4, line 2. After that, the applicant contends that c) because textured triangle rasterization resembles sparse matching of a template with an image, the applicants describe on page 16, lines 3-13 that the texture memory and frame buffer of 3D rasterization hardware can be adapted to process the template and image to be matched. Finally, the applicant contends that d) the alpha blending device is fully supported by the specification.

Examiner's Response: The examiner disagrees. In response to the applicant's first point a), that a graphics rasterizer can be used to compute statistics, the portion of the specification is replete with language that appears to have no antecedent basis in the specification and therefore, has nothing to do with the invention described in the general overview. This portion of the

specification describes that the address generator interpolates parameters. What parameters is the device interpolating. This is the first time that any parameters are mentioned in the specification. Furthermore, this section describes that a second memory device is used to compute an interpolated texture value. How does a memory device interpolate a texture value? What texture value is being interpolated? Next, this portion of the specification describes that comparison statistics between two colors are gathered. For what colors are statistics being gathered? This is the first time in the specification that colors are even mentioned. Finally, this portion of the specification describes that statistics are gathered depending on the results of an acceptance test. To what acceptance test is the applicant referring? Where has an acceptance test ever taken place prior to this in the description? Regarding point b) the applicant has stated in the remarks included with amendment filed on March 5, 2003, that a point of novelty of the invention is that a graphics rasterizer can be used for computing statistical information which can be compared (see remarks: page 9, paragraph 2). However, when this "portion of the novelty of the applicant's invention" is described in the specification on page 3, line 18 – page 4, line 2, the applicant states that "statistical generation can be performed by the rasterizer" (emphasis added). No further description is given. Computerized systems can perform many different functions depending on how they are programmed. If this is a point of novelty of the invention, a better description than the rasterizer can perform statistical generation needs to be provided. Regarding point c, it is unclear from the cited portion of the specification that textured triangle rasterization is equivalent to sparse matching of a template with an image. This portion of the specification merely states that a template is treated as a texture and instead of rasterizing the texture into a frame buffer, statistics are calculated. This portion of the specification never describes a comparison and it is

unclear how this process is equivalent to a comparison as argued by the applicant. Furthermore, this portion of the specification calls for resampling the template using a perspective transformation. This is the first time in the specification that a perspective transformation is mentioned. What is a perspective transformation as used by the applicant? Regarding point d), while the applicant mentions an alpha blending device in the specification, a clear definition of the functions of this device is never described. What purpose does this device serve? On page 14, lines 13-19, the specification describes that the "alpha values can be used to compute statistics". However, the specification never describes how this function is actually performed. It merely states that it "can be" performed. Furthermore, the text of page 15, line 26 – page 16, line 2 does not clearly state the function of the alpha blending device. What does the alpha blending device use the "additional ... color component" for? The specification never clearly states the use of this additional color component. It merely states that it "corresponds to the opacity of a surface". Clarification of the above mentioned issues is required.

35 U.S.C., second paragraph rejections

Summary of Arguments: In view of the arguments with respective to the arguments refuting the 35 U.S.C. 112, first paragraph rejections, these claims particularly point out and distinctly claim the subject matter which the applicant regards as the invention. Furthermore, Claim 18 has been amended to correct antecedent problems.

Examiner's response: Examiner disagrees. As the examiner has stated in response to the arguments refuting the 35 U.S.C. 112, first paragraph rejections, the specification lacks support for and a clear description of the claimed invention. The metes and bounds of the claims that are

apparently drawn to the model building embodiment and that include image comparison are still completely unclear.

Prior Art Rejections

35 U.S.C. 102 rejections

Summary of Arguments: The applicant argues that Neff fails to teach or suggest a graphics rasterizer or a 3D graphics processor.

Examiner's response: The examiner disagrees. The specification describes a graphics rasterizer as depicted in Fig. 4. If a reference teaches all of the components of a given device, then the devices are equivalent. Fig. 1 of Neff has all of the components of Fig. 4; therefore, the device depicted in Fig. 1 of Neff is a graphics rasterizer. Furthermore, claim 9 has been interpreted by the examiner as reading "... a raster processor that transforms at least one of the templates and accumulates information for each digital template; and a compare ...". Therefore, this limitation is met by Neff as can be seen in Fig. 1 of the reference. This process is performed by the address generator 40 and the comparison means 28.

Summary of Arguments: The applicant argues that Schott fails to teach or suggest a graphics rasterizer or a 3D graphics processor.

Examiner's response: Applicant's arguments with respect to claims 1 and 4-8 over Schott have been considered but are moot in view of the new ground of rejection, necessitated by the amendment.

Conclusion

11. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J. Miller whose telephone number is (703) 306-4142. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.

Ryan J. Miller
Examiner
Art Unit 2621

Ryan J. Miller
May 14, 2003

BRIAN WERNER
PRIMARY EXAMINER